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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/820,613	04/08/2004	Kalin Spariosu	PD-03W133	8186

7590 07/27/2007

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EXAMINER	
NGUYEN, TUAN N	
ART UNIT	PAPER NUMBER
2828	

MAIL DATE	DELIVERY MODE
07/27/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/820,613	SPARIOSU ET AL.	
	Examiner	Art Unit	
	Tuan N. Nguyen	2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 May 2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *23* is/are allowed.

6)☒ Claim(s) *1-22, 24-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or non-obviousness.

2. Claims 1-3, 7,8, 12, 13, 26, 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hemmati (US 5408480).

With respect to claims 1, 7, 8, 12, 13 Hemmati '480 shows and discloses a laser comprising: an active medium disposed within a resonator *(Fig 2: 21 laser medium within resonator mirrors 24, 25)*; a material operationally coupled to said medium and having a transmittance property that varies in response to incident energy *(Fig 2: 23 Q switch material coupled to medium with transmittance varies in respond to the laser input)*; and means disposed external to said medium for applying energy to said material *(Fig 2: 26 diode laser mean*

external to medium applying energy to Q switch). The claim further requires that said means having a response time that is shorter than round trip delay time of light within said resonator. Hemmati '480 did not discretely disclose the respond time is shorter than round trip delay light within the resonator, however Hemmati '480 shows and discloses in *(Fig 2: 27 low current control source controlling laser diode "26" output that switch/trigger the Q switch 23 output at a desire wavlength) and (Fig 1: 14 switch control driver controlling Q switch output);* it is inherently obvious and within one skill in the art to recognize, the energy from the external means response time is shorter then its round trip delay within the resonator because of additional time spent within the resonator. In addition, it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, in this case the control source can vary from higher to lower frequency such that when a laser oscillating longitudinal is equal to an integral multiple of the transverse oscillation, then the wavelengths will phase lock. Since claims 12, 13 recites the same or identical elements/limitations it is inherent to use patents '480 to recite the method of lasing, product by process.

With respect to claims 2, 27 Hemmati '480 discloses wherein said material is a saturable absorber *(Col 1: 60 passive Q switch – saturable absorber).*

With respect to claim 3, Hemmati '480 shows and discloses means for applying energy includes a diode laser adapted to deliver an optical pulse of duration shorter than a round trip delay time of light within said resonator *(Fig 2: 26 diode laser mean external to medium*

applying energy to Q switch) in *(Fig 2: 27 low current control source controlling laser diode "26" output that switch/trigger the Q switch 23 output at a desire wavlength) and (Fig 1: 14 switch control driver controlling Q switch output).*

With respect to claims 26, Hemmati '480 shows and discloses a laser comprising: an active medium disposed within a resonator *(Fig 2: 21 laser medium within resonator mirrors 24, 25)*; a material operationally coupled to said medium and having a transmittance property that varies in response to incident energy *(Col 1: 60 passive Q switch –saturable absorber, and inherent varies in response to incident energy such as abosorbing)*; and means disposed external to said medium for applying energy to said material, said means having a response time that is shorter than or equal to a round trip delay time of light w/thin said resonator *(Fig 2: 26 diode laser mean external to medium applying energy to Q switch;).* It is inherently obvious and within one skill in the art to recognize, the energy from the external means response time is shorter then its round trip delay within the resonator because the wavelength spent more time within the resonator.

3. Claims 4-6, 9-11, 14-22, 24, 25, 28-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hemmati (US 5408480) in view of Halmos et al. (US 2002/0051470).

With respect to claims 4, 5, 9, 10, 29, 30 Hemmati '480 discloses the above. The claims further require the means includes focusing optics or dichroic beamsplitter disposed between said diode laser and said absorber material. It has been held that omission of an element in a

combination where the remaining elements perform the same functions involves only routine skill in the art, in this case a mirror/prism/collimating lens or dichroic beam splitter can be used to directing/focusing or tuning the beam wavelength output from the diode laser prior to shinning on the saturable absorber (SA). Halmos et al. ('470) shows the use of splitter and focusing optics in the mode-lock system (Fig 1a: 130, 140, 150, 170, POLARIZER, switching means). It would have been obvious to one of ordinary skill in the art to provide Hemmati '480 the element as taught or suggested by Halmos et al. ('470) to directing/focusing/or splitting the beam wavelength output.

With respect to claim 6, 11, 14, 31 Halmos et al. ('470) discloses and shows a quasi-monolithic diode laser assembly ring disposed external to said medium for applying energy the laser structure *(Title: a Laser Q-Switchd and Mode-locked) (Fig 1a, 2a: 120, 150, 140 quasi-monolithic diode laser assembly ring external to said medium).*

With respect to claims 15, 24 Halmos et al. ('470) disclose a dual mode laser comprising (ABSTRACT)(Sections [0008; 0009]: an active medium disposed within a resonator cavity *(Fig 1a: 100 active medium)*; means for changing the length of said cavity from a first length in a first mode of operation to a second length in a second mode of operation *(Fig 1a,2a: 130, 140, 160, 170, 190)(Section [0024-0028] means changing cavity length with first mode-locked and second Q-switching)*; a material operationally coupled to said medium and having a transmittance property that varies in response to incident energy *(Fig 1a: 150 Q-switch material varies in response to incident energy)*;

With respect to claim 16, Hemmati '480 discloses wherein said material is a saturable absorber *(Col 1: 60 passive Q switch – saturable absorber).*

With respect to claim 17, Hemmati '480 shows and discloses means for applying energy includes a diode laser *(Fig 2: 26 diode laser mean external to medium applying energy to Q switch).*

With respect to claim 18 Halmos et al. ('470) shows and discloses an outcoupler and a first highly reflective mirror arranged to provide said resonator cavity therebetween *(Fig 1a: 110, 190 OUTPUT COUPLER, high reflective mirror provide resonant cavity).*

With respect to claim 19 Halmos et al. ('470) shows a polarizer disposed between said outcoupler and said mirror (Fig 1a: 140 POLARIZER).

With respect to claim 20 Halmos et al. ('470) shows means for changing the length of said cavity includes a polarization rotator disposed in optical alignment with said medium and said polarizer *(Fig 1a: POLARIZER, 130 rotator means to change length of cavity)(Section [0008-0009].*

With respect to claim 21 Halmos et al. ('470) shows a second highly reflective mirror in operational alignment with said polarizer (Fig 1a: 120 HR high reflector aligned with polarizer 140).

With respect to claim 22 Halmos et al. ('470) discloses wherein said first mode is a Q-switched mode and said second mode is a mode-locked mode *(Section [0008]).*

With respect to claims 25, Hemmati '480 shows and discloses a laser comprising: an active medium disposed within a resonator *(Fig 2: 21 laser medium within resonator mirrors 24, 25),*a saturable absorber operationally coupled to said medium and having a transmittance property that varies in response to incident energy *(Col 1: 60 passive Q switch – saturable absorber, and inherent varies in response to incident energy such as abosorbing)* and means disposed external to said medium for applying energy to said saturable absorber, said means having a response time that is shorter than or equal to a round trip delay time of light within said resonator *(Fig 2: 27 low current control source controlling laser diode "26" output that switch/trigger the Q switch 23 output at a desire wavlength) and (Fig 1: 14 switch control driver controlling Q switch output).* The claim further requires *said means for applying energy being a quasi-monolithic diode laser assembly ring* including: *a diode laser* adapted to deliver an optic pulse of duration shorter than or equal to said round trip delay time of light within said resonator, *focusing optics* disposed between said diode laser and said material, *and a dichroic beamsplitter* for directing said energy to said absorber material. Hemmati '480 did not discreetly disclose the above elements, however Halmos et al. '470 shows

and discloses the use of splitter and focusing optics in a Q-switch and mode-lock system, 3including a quasi-monolithic diode laser assembly ring disposed external to said medium for applying energy to the laser structure *(Fig 1a: 130, 140, 150, 170, POLARIZER, switching means) (Title: a Laser Q-Switchd and Mode-locked) (Fig 1a, 2a: 120, 150, 140 quasi-monolithic diode laser assembly ring external to said medium).* It would have been obvious to one of ordinary skill in the art to provide Hemmati '480 the element as taught or suggested by Halmos et al. ('470) to directing/focusing/or splitting the beam wavelength output to deliver an optic pulse of duration shorter than or equal to said round trip delay time of light within said resonator

With respect to claim 28 wherein said means for applying energy includes a diode laser adapted to deliver an optical pulse of duration shorter than or equal to said round trip delay time of light within said resonator (Fig 2: 22, 26).

Allowable Subject Matter

4. The following is an examiner's statement of reasons for allowance - Applicant's remark response filed on 11/14/2006 has been considered, with respect to claim 23 the references of the record fail to teach or suggest a dual mode laser comprising:

Claim 23:

An output coupler with active medium having a saturable absorber coupled to the gain medium disposed within a first and second reflective mirrors, where the output coupler and first mirror defined a first mode of operation and the second mirror in a second mode of operation, where a polarizer and a polarization rotator aligned with the outcoupler and changing the beam reflected, and a laser diode disposed external to the gain medium applying energy with pulse

duration shorter than round trip delay within the resonator in the first mode of operation and mode-locking in the second mode of operation.

Response to Argument/

5. Applicant's remarks filed on 05/29/2007 have been fully considered but they are not persuasive. On pages 8-11, the Applicant pointing out the references fail to point out "*Claim 1 recites: A laser medium disposed within a resonator; a material operationally coupled to said medium and having a transmittance property that varies in response to in response to incident energy; and*

means disposed external to said medium for applying energy to said material, ***said means having a response time that is shorter than a round trip delay time of light within said resonator***"; continue on page 9 the Applicant point out " *the Examiner relied on Hemmati with optically driven Q-witch... However, the is no teaching in the reference a laser with an active medium disposed in a resonator, a material having a transmittance property that varies in response to incident energy and means for applying energy to the material with a response time that is* ***shorter than*** *a round trip delay time of light within the resonator*", the Applicant further point out *"...the Examiner suggested that Hemmati shows a low current control source controlling a laser diode output that switches or triggers a Q switch at a desired wavelength such that a disclosure of a general condition of a claim such that the invention as claimed involves only an optimal or workable range within one ordinary skill in the art...*"

With respect to the above remarks, the examiner wants to pointing out the - not only the claims consist of a single means and insufficient structure of performing the functional

relationship as disclosed. Even though the reference did not discreetly disclose the functional language as presented in the claim, the functional language is not patentable because *at least the means has a response time that is* ***shorter than*** *to a round trip delay time of light within the resonator; This can be seen from Applicant own disclosure of Background in Remark pages 10-11 "In laser, lasing element is place within a laser resonator cavity and pumped with an energy source ... there is a net light amplification per round trip of the light in the resonator cavity, laser light begins to built up in the cavity, and stored energy is released ... the device called a Q- switching...", hence the means has a response time* ***shorter than*** *the delay time of light with the resonator when/while it is building up the stored energy,* therefore, the claims were appropriately rejected under 103. Furthermore, *(Fig 2: 21 laser medium within resonator mirrors 24, 25)* and *(Fig 2: 23 Q switch material coupled to medium with transmittance varies in respond to the laser input)* shows a laser with active medium disposed in resonator and means for applying energy to the material.

Continue on pages 9-11, the Applicant remarks *" the Examiner suggests Hemmati's teaching a control source can vary from a higher frequency to a lower frequency such that when the laser oscillating longitudinally, is equally to an integral multiple of the transverse oscillation, then the wavelengths will phase lock... 1st) the reference appears to be incapable of enabling. mode-locking inasmuch as a high average transparency condition can not be implemented in the dye with the disclosed scheme for pumping into an excited state where it strongly absorbs at the laser wavelength. In order to implement a mode-locked SA technique one needs to reduce the hold-off substantially to facilitate a quasi-continuous wave operation with only a slight modulation at the roundtrip frequency; 2nd) the Examiner's position misses the*

point. The claimed application of energy to the material with a response time that is shorter than or equal to a round trip delay time of light within the resonator is for the purpose of achieving a fast bleaching of a saturable absorber material for passive Q-switching, not simply or necessarily for mode-locking as suggested".

With respect to the above remark, 1st) Hemmati's teaching capable of enabling mode-locking even implemented in the dye, *"A mode-locked laser is a laser to which the technique of active or passive mode locking is applied. In the early days, one routinely used dye lasers, pumped with argon ion lasers. Laser dyes have a broad gain bandwidth, allowing for very short pulses. However, dye lasers have been largely replaced with solid state lasers once these were able to deliver similar or better performance," the mode-locked information can further view from the web or http://www.rp-photonics.com/mode_locked_lasers.html: Encyclopedia of Laser Physics and Technology.* 2nd) Since the claim requires "*a response time that is* ***shorter than or equal to a round trip delay time*** *of light within the resonator is for the purpose of achieving a fast bleaching of a saturable absorber material for passive Q-switching"* the reference has met the limitation *a response time that is* ***shorter than or equal to a round trip delay time*** *of light within the resonator is for the purpose of Q-switching*

On page 12, the Applicant continue to suggests " Applicant encourage the Examiner to consider that from a Q-switching perspective ..... the 103 inherent obvious assertion is not obvious to those skilled in the art as it is a specific implementation of a high speed switched AS-based Q-switched laser", and continue to argues about the mode locking with examples of numerical values. Please refer to above response to Q-switching, mode-locking, and time delay. The examiner wants to note - patentability of the claim is based on what is being claimed, and it

is not proper to read limitations in the specification. The examiner read the claims with broadest reasonable interpretation

Conclusion

6. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP 706.07. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Communication Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan N Nguyen whose telephone number is (571) 272-1948. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harvey Minsun can be reached on (571) 272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be

obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Tuan N. Nguyen